

AMENDMENTS TO THE CLAIMS:

1. (Currently amended) A disk drive apparatus for controlling, under supply of a power voltage having a predetermined rating voltage level, a head drive section to position a head in a radial direction of an information recording disk and carry out a write and/or read operation of information while rotatively driving the information recording disk by a rotation drive motor, said disk drive apparatus comprising:

~~a forcible restoring section for controlling said head drive section to forcibly bring said head to a retract position when said power voltage goes below a first voltage level smaller than said rating level; and~~

a voltage level monitor for monitoring the level of the power voltage with reference to each of an intermediate voltage level and a bottom voltage level, where the intermediate voltage level is lower than the rating voltage level, and the bottom voltage level is lower than the intermediate voltage level;

~~a normal restoring-retract section for controlling said head drive section to move-cause said head to move in a direction toward said a retract position, on the basis of said using the power voltage, when said in response to the monitored level of the power voltage goes being below a second the intermediate voltage level; and smaller than said rating level but greater than said first voltage level.~~

a forcible retract section for controlling said head drive section to forcibly bring the head to the retract position in response to the monitored level of the power voltage being below the bottom voltage level.

Serial No.: 09/839,539
Docket No. PU01-0171
FUJI.004

2. (Previously presented) A disk drive apparatus according to claim 1, wherein said information recording disk comprises a magnetic disk.
3. (Previously presented) A disk drive apparatus according to claim 2, wherein said head comprises a magnetic head, and said retract position includes a ramp provided for said magnetic head to run thereon.
4. (Previously presented) A disk drive apparatus according to claim 1, wherein said power voltage comprises a voltage based on a battery voltage of a vehicle-mounted battery to be charged by a generator operating responsive to rotation of a vehicle-mounted engine.
5. (Currently amended) A disk drive apparatus according to claim 4, further comprising a microprocessor for operating said forcible ~~restoring~~ retract section and said normal ~~restoring~~ retract section with said power voltage.
6. (Previously presented) A disk drive apparatus according to claim 4, wherein said recording disk has navigation information recorded thereon, and said apparatus is mounted in a vehicle.
7. (Currently amended) A disk drive apparatus according to claim 6, wherein only a battery voltage to said disk drive apparatus is monitored to detect variation in said ~~the level of~~ the power voltage.

8. (Currently amended) A disk drive apparatus for controlling, under supply of a power voltage, a position of a read/write head in a radial direction of an information recording disk, to bring the head to a periphery of the information recording disk under low power conditions, said disk drive apparatus comprising:

a rotation drive motor for rotating the information recording disk;

a head drive section for driving the head over the information recording disk;

a voltage ~~value~~level monitor for monitoring the ~~value~~level of the power voltage;

and

a controller, responsive to the monitored ~~value~~level of the power voltage being above a ~~first~~-predetermined intermediate voltage level, for providing the power voltage to said rotation drive motor to rotate the information recording disk and to said head drive section to drive the head in a first direction, wherein:

said controller is responsive to the monitored ~~value~~level of the power voltage being equal to or less than the ~~first~~-predetermined intermediate voltage level and above a ~~second~~-predetermined bottom voltage level, for providing the power voltage to said head drive section to drive the head toward the periphery of the information recording disk, and

said controller is further responsive to the monitored level of the power voltage being equal to or less than the ~~second~~-predetermined bottom voltage level, for providing reverse electromotive force from said rotation drive motor to said head drive section to drive the head to the periphery of the information recording disk.

9-10. (Canceled)

Serial No.: 09/839,539
Docket No. PU01-0171
FUJI.004

11. (Previously presented) A disk drive apparatus according to claim 8, further comprising an information recording disk having navigation information recorded thereon.

12. (Previously presented) A disk drive apparatus as claimed in claim 8, further comprising a ramp adjacent the periphery of the disk for supporting the head when said head drive section is not driving the head.

13. (Currently amended) A disk drive apparatus as claimed in claim 8, wherein the power voltage is provided from a vehicle-mounted generator, and said voltage ~~value-level~~ monitor is adapted to monitor the level of the voltage from the vehicle mounted generator.

14. (Currently amended) A disk drive apparatus, comprising:

- a rotation drive motor for rotating an information recording disk;
- a read/write head for reading and writing information on the information recording disk;
- a head drive motor for driving the head over the information recording disk;
- a voltage input for providing voltage to said rotation drive motor and to said head drive motor;
- a voltage ~~value-level~~ monitor for monitoring the ~~value-level~~ of the voltage provided by said voltage input; and
- a controller, responsive to the level of the monitored voltage ~~value~~ being above a ~~first~~ predetermined intermediate voltage level, for providing voltage from said voltage input

Serial No.: 09/839,539
Docket No. PU01-0171
FUJI.004

to said rotation drive motor₁ to rotate the information recording disk₁ and to said head drive motor₁ to drive the head in a first direction, wherein:

said controller is further responsive to the level of the monitored voltage ~~value~~ being equal to or less than the ~~first~~-predetermined intermediate voltage level and above a ~~second~~ predetermined bottom voltage level for providing voltage from said voltage input to said head drive motor to drive the head toward the periphery of the information recording disk, and

said controller is further responsive to the level of the monitored voltage ~~value~~ being equal to or less than the ~~second~~-predetermined bottom voltage level for providing reverse electromotive force from said rotation drive motor to said head drive motor to drive the head to the periphery of the information recording disk.

15-16. (Canceled)

17. (Previously presented) A disk drive apparatus according to claim 14, further comprising an information recording disk having navigation information recorded thereon.

18. (Previously presented) A disk drive apparatus as claimed in claim-14 17, further comprising a ramp adjacent the periphery of the disk for supporting said head when said head drive section is not driving the head.

19 (Previously presented) A disk drive apparatus as claimed in claim 14, wherein said voltage input is adapted to receive voltage from a vehicle-mounted generator.

Serial No.: 09/839,539
Docket No. PU01-0171
FUJI.004

20. (Currently amended) A disk drive apparatus as claimed in claim 19, wherein said voltage ~~value~~level monitor is adapted to monitor the level of the voltage from the vehicle mounted generator.

21. (Previously presented) A disk drive apparatus according to claim 14, wherein said controller comprises:

a head drive control circuit for controlling said head drive motor to drive the head to a desired position over the information recording disk; and

a processor for providing instructions to said head drive control circuit.

22. (Currently amended) A disk drive apparatus for controlling, under supply of a power voltage of a level equal to or smaller than a predetermined rating level, a head drive section to position a head in a radial direction of an information recording disk and carry out a write and/or read operation of information while rotatively driving the information recording disk by a rotation drive motor, said disk drive apparatus comprising:

~~first means for controlling said head drive section to forcibly bring said head to a retract position when said power voltage goes below a first voltage level, smaller than said rating level; and~~

first means for monitoring the level of the power voltage with reference to each of an intermediate voltage level and a bottom voltage level, where the intermediate voltage level is lower than the rating voltage level, and the bottom voltage level is lower than the intermediate voltage level;

Serial No.: 09/839,539
Docket No. PU01-0171
FUJI.004

second means for controlling said head drive section to ~~move-cause~~ said head to move in a direction toward said a retract position on the basis of said using the power voltage when said in response to the monitored level of the power voltage goes being below a second the intermediate voltage level; and smaller than said rating level but greater than said first voltage level.

third means for controlling said head drive section to forcibly bring the head to the retract position in response to the monitored level of the power voltage being below the bottom voltage level.

23. (Currently amended) A disk drive, comprising:

a rotation drive motor for rotating an information recording disk;

a head for reading and/or writing information onto and/or from the information recording disk;

a voltage input for receiving ~~a predetermined rating level of a power voltage;~~

a detector for detecting an abrupt decrease in the level of the power voltage;

~~—— a forcible restoring section, responsive to detection of an abrupt decrease in the power voltage to level less than a first predetermined level, lower than the rating level, for moving said head in a direction toward an outer periphery of the information recording disk under power of reverse electromotive force from said rotation drive motor; and~~

a normal ~~restoring~~ retract section, responsive to detection of an abrupt decrease in the level of the power voltage to a second predetermined intermediate voltage level, lower than the a rating level of the power voltage, and equal to or greater than the first

Serial No.: 09/839,539
Docket No. PU01-0171
FUJI.004

~~predetermined level~~, for moving said head in a direction toward an outer periphery of the disk under power of voltage from said voltage input; and

a forcible retract section, responsive to detection of an abrupt decrease in the level of the power voltage to a level less than a predetermined bottom voltage level, lower than the predetermined intermediate voltage level, for moving said head in the direction toward the outer periphery of the information recording disk under power of reverse electromotive force from said rotation drive motor.

24. (Previously presented) A method of controlling a head drive section to position a head in a radial direction of an information recording disk and carry out a write and/or read operation of information, said method comprising:

providing power voltage to a rotation drive motor to rotate the information recording disk;

monitoring the level of the power voltage with reference to each of an intermediate voltage level and a bottom voltage level, where the bottom voltage level is lower than the intermediate voltage level;

in response to the monitored level of the power voltage falling to a value level equal to or less than a first the predetermined intermediate voltage value level, moving the head toward a retract position under power of the power voltage; and

in response to the monitored level of the power voltage falling to a value level equal to or less than a second the predetermined bottom voltage value level, less than the first predetermined voltage value, forcibly moving the head to the retract position.

Serial No.: 09/839,539
Docket No. PU01-0171
FUJI.004

25. (New) A disk drive apparatus according to claim 1, wherein said voltage level monitor monitors the level of the power voltage on each of a backup power supply line and an accessory power supply line from a vehicular power supply circuit.

26. (New) A disk drive apparatus according to claim 8, wherein said voltage level monitor monitors the level of the power voltage on each of a backup power supply line and an accessory power supply line from a vehicular power supply circuit.

27. (New) A disk drive apparatus according to claim 14, wherein said voltage level monitor monitors the level of the power voltage on each of a backup power supply line and an accessory power supply line from a vehicular power supply circuit.

28. (New) A disk drive apparatus according to claim 22, wherein said first means monitors the level of the power voltage on each of a backup power supply line and an accessory power supply line from a vehicular power supply circuit.

29. (New) A disk drive according to claim 23, wherein said detector detects an abrupt decrease in the level of the power supply voltage by monitoring the level of the power voltage on each of a backup power supply line and an accessory power supply line from a vehicular power supply circuit.

Serial No.: 09/839,539
Docket No. PU01-0171
FUJI.004

30. (New) A method according to claim 24, wherein monitoring the level of the power voltage comprises monitoring the level of the voltage on each of a backup power supply line and an accessory power supply circuit.